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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,596	04/05/2006	Motohiko Sako	MAT-8837US	4300

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EXAMINER	
KARACSONY, ROBERT	
ART UNIT	PAPER NUMBER
2821	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,596	SAKO, MOTOHIKO	
	Examiner	Art Unit	
	ROBERT KARACSONY	2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to amendments received December 20, 2007. Claims 1-8 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Rutfors et al.* (US 2003/0189519, hereinafter *Rutfors*) in view of *Colburn et al.* (US 2005/0162321, hereinafter *Colburn*).

Claim 1: *Rutfors* teaches a composite antenna device comprising:

a ground board (10);

an unbalanced antenna (20) including

a first feeding point (24) coupled with the ground board (fig. 2),

a first radiator (22) having a first end (end of 22 connected to 24) and a second end (end opposite first end), the first end of the first radiator being connected with the first feeding point (fig. 2),

a load conductor (patch of 20) connected with the second end of the first radiator (fig. 2); and

a balanced antenna (231, fig. 2) including

a second feeding point (34),

a second radiator (231a, fig. 2) connected with the second feeding point, and

a third radiator (231b, fig. 2) connected with the second feeding point,

wherein the second radiator and the third radiator are placed at positions symmetrical to each other (fig. 2) about a straight line (virtual line that passes through feed point 24 which is perpendicular to the ground plane), respectively, which passes through the first feeding point and which is perpendicular to the ground board and have shapes symmetrical to each other about the straight line (fig. 2).

Rutfors fails to teach the load conductor has a shape symmetrical about the straight line. *Rutfors* does teach that the PIFA antenna can be one of various antennas [0043]. *Colburn* teaches a PIFA antenna for mobile terminals that is symmetrical about the feed point that can exhibit dual resonance frequencies (fig. 1, Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the PIFA antenna of *Colburn* as the PIFA antenna of *Rutfors* in order to have obtained dual resonance frequencies which is well known to be advantageous in the field of mobile communications.

Claim 2 is similar in scope as claim 1 and is therefore rejected for substantially the same reasons. Claim 2 adds the limitation that the load conductor has a shape electrically symmetrical to the straight line. (If the modifications to the invention of *Rutfors* were made, as discussed above, one with ordinary skill in the art would have realized that since the load conductor is geometrically symmetrical it is inherently electrically symmetrical)

Claim 3 is similar in scope as claim 1 and is therefore rejected for substantially the same reasons. Claim 3 varies from claim 1in that the load conductor has a shape symmetrical about a

plane. (Examiner interprets the virtual line to be a virtual plane that extends along the first radiator, each of which are positioned such that the elements are symmetrical about)

Claim 4 is similar in scope as claims 2 and 3 and is therefore rejected for substantially the same reasons.

Claim 5 is similar in scope as claim 1 and is therefore rejected for substantially the same reasons. If the modifications to the invention of *Rutfors* were made, as discussed above, one with ordinary skill in the art would have realized the load conductor has a first end (*Colburn* fig. 1, one end of metal plate 12), a second end (*Colburn* fig. 1, other end of metal plate 12 opposite first end) and a connection point (point which connects load conductor to feed), wherein the load conductor of the unbalanced antenna includes a first portion (*Colburn* fig. 1, one end of metal plate 12) and a second portion (*Colburn* fig. 1, other end of metal plate 12 opposite first end), the first portion of the load conductor being provided between the first end of the load conductor and the connection point (*Colburn* fig. 1), the second portion being provided between the second end of the load conductor and the connection point (*Colburn* fig. 1),

Rutfors fails to explicitly teach an impedance Z11 of the first portion of the load conductor, a mutual impedance Z12 of the second radiator to the first portion of the load conductor, a mutual impedance Z21 of the first portion of the load conductor to the second radiator, an impedance Z22 of the second radiator, an impedance Z33 of the second portion of the load conductor, a mutual impedance Z34 of the third radiator to the second portion of the load conductor, a mutual impedance Z43 of the second portion of the load conductor to the third radiator, and an impedance Z44 of the third radiator satisfy the relation of:

$$\begin{pmatrix} Z11 & Z12 \\ Z21 & Z22 \end{pmatrix} = \begin{pmatrix} Z33 & Z34 \\ Z43 & Z44 \end{pmatrix}.$$

However, *Rutfors* teaches an advantage of using a balanced and unbalanced antenna pair is that improved matching to the receiver/transmitter is achieved [0008], which will lower the coupling between the two antennas [0007]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have matched the impedance of the two antennas of *Rutfors* in order to have reduced the coupling between the two antennas.

Claim 6: *Rutfors* in view of *Colburn* teaches all of the limitations of claim 5, as discussed above. *Rutfors* fails to teach a mutual impedance Z14 of the third radiator to the first portion of the load conductor, a mutual impedance Z41 of the first portion of the load conductor to the third radiator, a mutual impedance Z23 of the second portion of the load conductor to the second radiator, and a mutual impedance Z32 of the second radiator to the second portion of the load conductor satisfy the relation of

$$\begin{pmatrix} Z11 & Z14 \\ Z43 & Z44 \end{pmatrix} = \begin{pmatrix} Z22 & Z23 \\ Z32 & Z33 \end{pmatrix}.$$

However, *Rutfors* teaches an advantage of using a balanced and unbalanced antenna pair is that improved matching to the receiver/transmitter is achieved [0008], which will lower the coupling between the two antennas [0007]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have matched the impedance of the two antennas of *Rutfors* in order to have reduced the coupling between the two antennas.

Claims 7 and 8 are similar in scope as claims 3 and 4, respectively, and are therefore rejected for substantially the same reasons.

Response to Arguments

4. Applicant's arguments filed December 20, 2007 have been fully considered but they are not persuasive.

5. Regarding the arguments that *Rutfors* does not disclose or suggest 1) "a load conductor has a shape symmetrical (electrically symmetrical) about a straight line/plane which passes through the first feeding point and which is perpendicular to the ground board or that 2) the second radiator and the third radiator are placed at positions symmetrical (electrically symmetrical) to each other about the straight line/plane (emphasis added)" (*see page 8, paragraph 3 and page 10, paragraph 2 of the Remarks*). Examiner respectfully disagrees with Applicant. Examiner notes, that the combined invention, *Rutfors* in view of *Colburn*, does in fact teach points 1 and 2, as recited above and in the claims. Radiating patch '12' of *Colburn* is symmetrical about feed tab '20' (*see fig. 1 of Colburn*). Therefore, if a virtual line/plane was taken to be one that is perpendicular to the ground plane and passes through the feed tab, radiating outer extensions '16', which are interpreted to be "second" and "third" radiators, are also symmetrical about the feed tab '20' and the virtual line/plane. Secondly, once the antenna of *Colburn* is combined with the invention of *Rutfors*, the dipole elements of *Rutfors* will now be symmetrical about the virtual line/plane. Since the elements are physically symmetrical, they are inherently electrically symmetrical.

6. Applicant argues that one of ordinary skill in the art would not be motivated to combine *Rutfors* in view of *Colburn* because the arrangement of the feed of *Colburn* is centered on the patch rather then located on the edge of the patch, as is the case in *Rutfors* (*see page 9, paragraph 2 of the Remarks*). Examiner respectfully disagrees with Applicant. Examiner

concedes that the feed point connections are in fact located in different positions on the radiating patch, however, the invention of *Rutfors* does not teach away from changing the position of the feed point. *Rutfors* teaches an unbalanced antenna surrounded by a balanced antenna such that the coupling between the two antennas can be lower than with two antennas both having unbalanced or balanced feeds (*see paragraphs [0007]-[0008]*). Since the position of the feed point is not a factor in determining whether or not an antenna is balanced or unbalanced, and *Rutfors* invites using a modified PIFA as the unbalanced antenna (*see paragraph [0043]*), one with ordinary skill in the art would have been motivated to combine *Colburn* with *Rutfors* without destroying the principal operation of *Rutfors*.

7. Applicant argues that *Rutfors* does not disclose "the load conductor of the unbalanced antenna includes a first portion and a second portion, the first portion … being provided between the first end of the load conductor and the connection point, the second portion being provided between the second end of the load conductor and the connection point" (emphasis added) (*see page 11, paragraph 4 of the Remarks*). Examiner respectfully disagrees with Applicant. The combined invention, *Rutfors* in view of *Colburn*, teaches the load conductor of the unbalanced antenna includes a first portion (examiner interprets one of elements '16' of Colburn) and a second portion (examiner interprets the other of element '16' of Colburn), the first portion … being provided between the first end of the load conductor and the connection point (fig. 1 of *Colburn* illustrates element '16' extending between feed tab '20' (connection point) and an edge (first end) of '16'), the second portion being provided between the second end of the load conductor and the connection point (fig. 1 of *Colburn* illustrates element '16' extending between feed tab '20' (connection point) and an edge (second end) of '16').

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT KARACSONY whose telephone number is (571)270-1268. The examiner can normally be reached on M-F 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas W. Owens can be reached on 571-272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. K./
Examiner, Art Unit 2821

/Hoang V Nguyen/
Primary Examiner, Art Unit 2821